

COST SENSITIVITY OF PIXEL CABLES

3-FEBRUARY, 2000

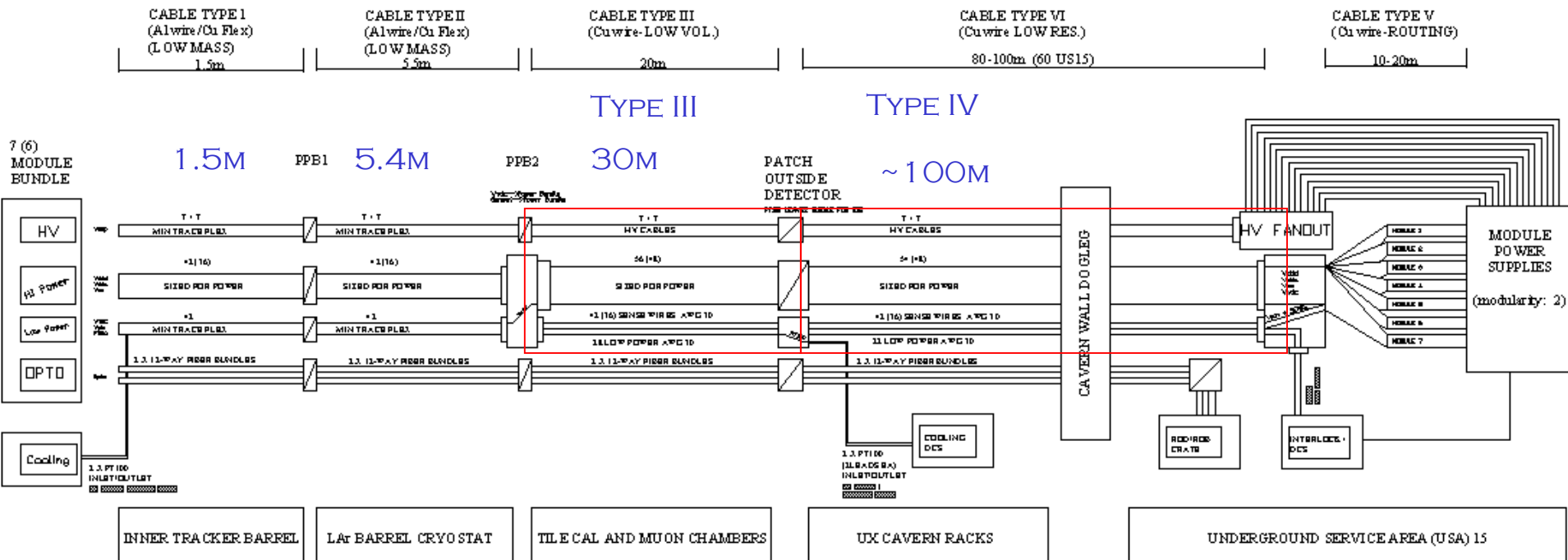
CABLE FOCUS SESSION

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PIXEL DETECTOR

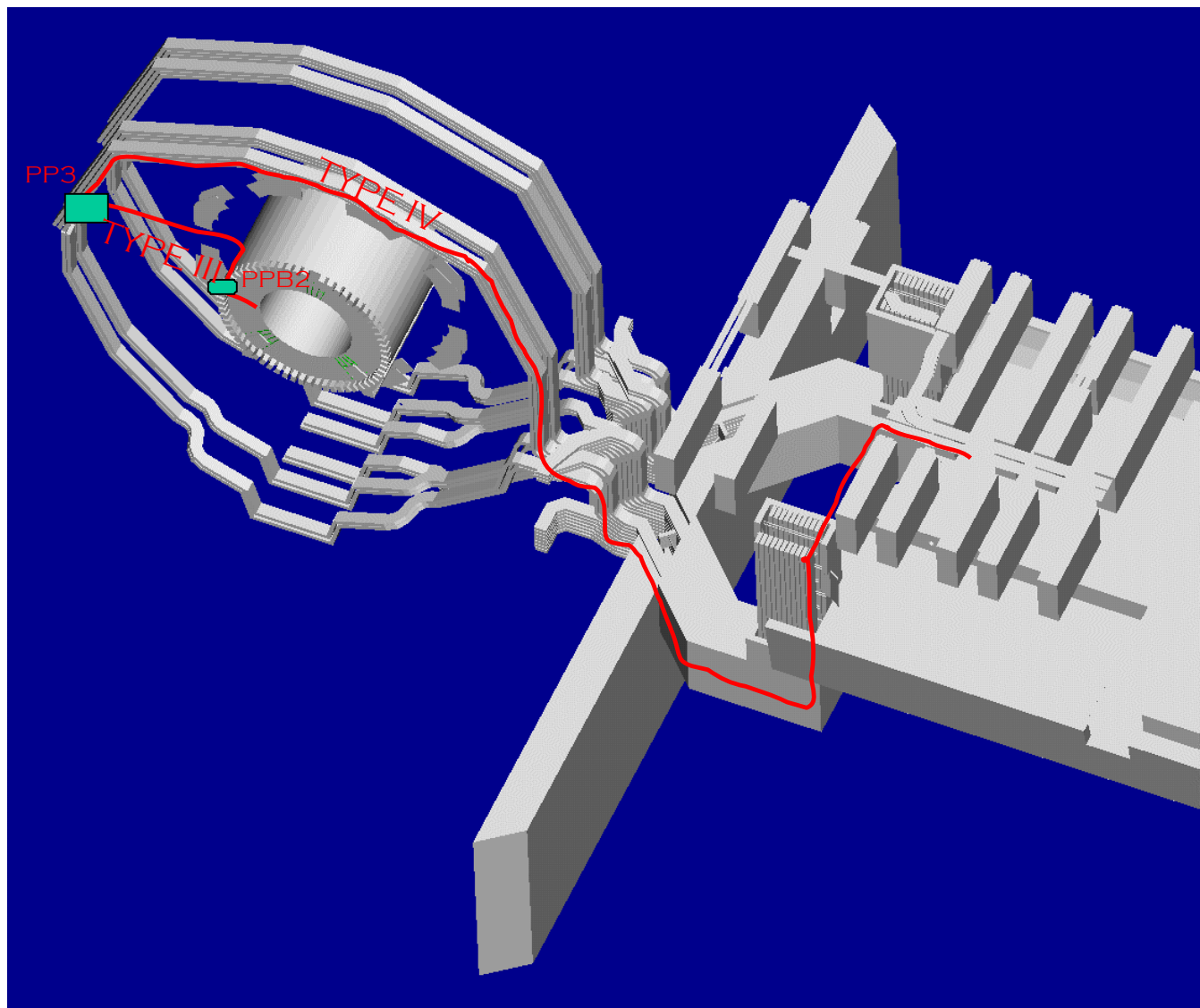
CABLE PLANT OVERVIEW

- REMINDER OF WHAT WE'RE TALKING ABOUT
- CABLE PLANT CONSISTS OF CABLE TYPES 1-5
- COST ESTIMATES PRIMARILY CONCERNED WITH TYPE III AND TYPE IV



PIXEL DETECTOR

CABLE PLANT PHYSICAL LAYOUT



PIXEL DETECTOR

BASIS FOR ESTIMATE

- **ROUGH ORDER OF MAGNITUDE**
 - STARTED WITH TRYING TO COUNT EVERYTHING
- **LABOR ESTIMATES**
 - ESTIMATE OF FTE'S REQUIRED TO COMPLETE DELIVERY OF FLEX
 - PATCH PANEL PROTOTYPE EFFORT
- **VENDOR QUOTE**
 - TWISTING, CUSTOM CABLE, TERMINATION AND CONNECTORS,
- **COMPARISON TO OTS COMPONENTS**
 - CONNECTORS MATCH PRETTY WELL WITH LABOR AND PART COST
 - WIRE IS SOMEWHAT HIGH IN VENDOR QUOTE COMPARED TO OTS CABLE
- **CURRENT ESTIMATE IS AN ORDER OF MAGNITUDE MORE THAN IS CURRENTLY IN CORE**
 - EASY TO ACCOUNT FOR FACTOR ~ 5
 - CABLE LENGTH UNDERESTIMATED IN INITIAL ASSESSMENT
 - VOLTAGE DROP STAYED THE SAME-DRIVING COST AS SQUARE OF LENGTH ERROR
 - POWER INCREASED

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LABOR ESTIMATE

- **CONNECTORS**

- FULL TERMINATION VARIES BETWEEN 1-3 MINUTES PER PIN IN PRODUCTION, HAND TERMINATION ~ 1-3 \$/PIN
- THIS SEEMS TO ALSO BE PROPORTIONAL TO CONNECTOR COST WITHIN FACTOR 2

- **FLEX CABLE PRODUCTION**

- PROCESS TUNED FOR 1.5 FTE'S
- ~ 1.5 MAN-DAYS PER EXPOSURE

- **TOTAL LABOR PROPORTIONAL TO SURFACE AREA**

- TYPE 1 POWER
 - 24k
- TYPE 2 POWER
 - 124k
- MINTRACE FLEX-2 PER BUNDLE
 - 62k
- HIGH VOLTAGE
 - 32k

PIXEL DETECTOR VENDOR QUOTE

- **GLENAIR**
 - GENERALIZED CABLE BUNDLE TO MAX LENGTH, AND 7-WAY BUNDLE
 - ROM ESTIMATE OF COST/FT
 - PROBLEMS WITH IS4 1,
- **CONNECTORS**
 - MIL C ROUND
 - COST OF TERMINATION \approx COST OF CONNECTOR
- **NEED TO GET ANOTHER QUOTE FOR COMPARISON**

PIXEL DETECTOR

COMPARISON WITH SCT

- **COST PER METER BREAKDOWN.XLS**
- **SUMMARY COST PER MODULE**
 - SCT HAS INDIVIDUAL CABLES PER MODULE
 - MAKING AN “EQUIVALENT” CABLE USING OUR QUOTES/ESTIMATES BY SUBTRACTING ELEMENTS FROM OUR ESTIMATE IS POSSIBLE
 - COST OF SCT CABLE/METER IS WITHIN FACTOR 2 OF OUR COST/METER (1.7)
- **DIFFERENCES**
 - POWER
 - WE HAVE 3 PRIMARY VOLTAGES THEY HAVE 2
 - THEY HAVE CHOSEN A LARGER VOLTAGE DROP (SMALLER CONDUCTOR)
 - CONTROL
 - WE HAVE ~60% MORE CONTROL PAIRS
 - THEY HAVE DISPENSED WITH RETURN LINES FOR MOST OF THEIR CONTROL LINES
 - HIGH VOLTAGE
 - 500V SPEC IS NORMAL, WE HAVE 1 000V WHICH IS MORE EXPENSIVE

PIXEL DETECTOR

SENSITIVITY

- **GLENAIR COST SUMMARY.XLS**
- **LENGTH-VARIES BETWEEN 20-40kCHF/M**
 - ERRORS IN LENGTH ESTIMATES
 - TYPE IV ~ 10M
 - TYPE III ~ 5M
 - POSSIBILITY TO US US 15
 - COULD SAVE 10-15M
- **SENSE**
 - CLEAR CUT
- **INDIVIDUAL RETURNS**
 - DIFFICULT TO KNOW HOW DEEP TO CUT, BUT COST IS LINEAR
- **VOLTAGE DROP**
 - DIFFICULT TO ASSESS
 - COST SAVINGS OFFSET BY NEED FOR OTHER ELECTRONICS
- **MATERIALS**
 - DIFFICULT TO UNDERSTAND